Results of the IMO Video Meteor Network – October 2018

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The perfect observing conditions of the previous months continued until mid of October. 78 out of 82 video cameras were in operation on October 4/5. and overall 65 cameras managed to observe in twenty or more observing nights. Only in the last decade the observing conditions deteriorated significantly and at some observing sites breaks of more than a weak resulted from poor weather. In total we collected over 13.700 hours of effective observing time. which is the best October result ever and the fourth best output of any month in the history of the IMO network. Also. the meteor number of almost 75.000 marked a record for this month. which is in part thanks to the Draconids which we will discuss later. First. we want to welcome Stefano Missiaggia. who has been supporting our network since October 2018. He operates a Mintron camera named TOALDO with a 4.5 mm f/1.2 lens from the small city of Nove in northern Italy.

In the timely sequence. the October Camelopardalids were the first relevant shower of October. It has a small full-width-at-half-maximum (FWHM) and can only be recorded by the IMO network if the peak falls into the European nighttime hours. From the years 2011-2016 we had recently derived a peak time of 192.59° solar longitude with an activity of about 7 meteoroids per 1.000 km^2 and hour. In 2017 the peak was somewhat early (192.50° solar longitude) and with a flux density beyond 25 also stronger than before. Hence. for 2018 we expected the peak on October 6 between 2 and 4 UT. The small waxing crescent moon hardly disturbed the observations. and the weather was also favorable for observers in central Europe – perfect conditions to analyze this shower in more detail.
Indeed. the cameras of the IMO network managed to record almost 350 October Camelopardalids in the night of October 5/6 – more than in the years before. Figure 1 shows a "perfect" activity profile with highest rates near 1 UT (192.47° solar longitude). i.e. three hours earlier than in the long-term average. The flux density was up to 7 meteoroids per 1.000 km^2 and hour and matched to the long-term average. The FWHM was only 0.07° solar longitude resp. two hours. Thus. the peak was shorter than in previous years. but longer than in the year before. With r=1.95. the population index of the Camelopardalids was much smaller than the sporadic population index (r=2.7). i.e. the shower comprised of many bright meteors.

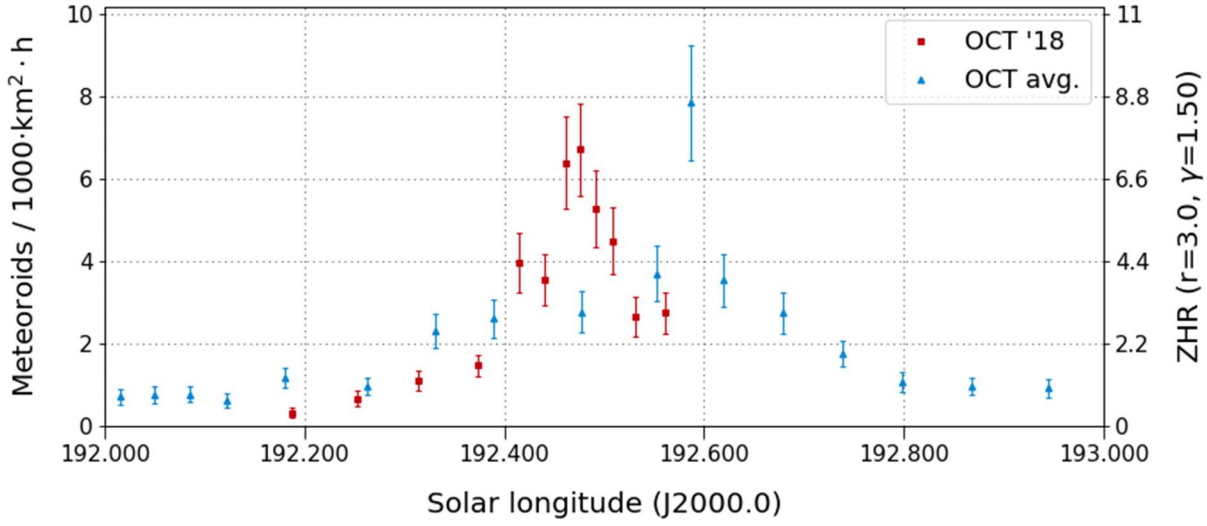

Figure 1: *Comparison of the flux density profile of the October Camelopardalids 2018 (red) and in the average of 2011-2016 (blue). derived from video data of the IMO Network.*

Since the peak time seems to vary. we had a closer look at the maxima since the discovery of the shower back in 2005. Figure 2 depicts the time of peak vs. year. The size of the bullets represents the strength of the peak. Note that we have no flux density data before 2011. so until 2010 we can only estimate the peak time (based on the absolute number of shower meteors uncorrected for the limiting magnitude and effective observing time). but not the strength. We can see that in all the year between 2005 and 2014 the peak occurred at about 192.60° solar longitude. Only in 2017 and 2018 it was early. In the future we will see if this trend continues and reflects the evolution of the meteor shower.

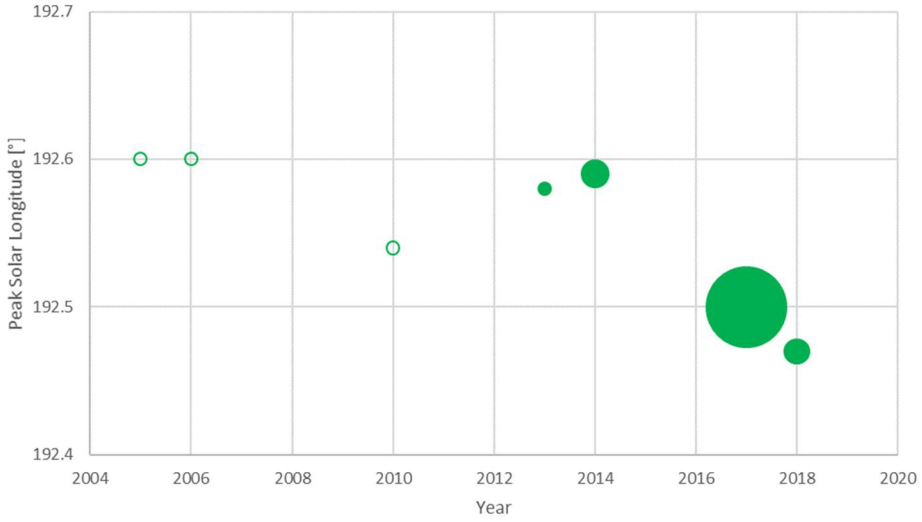

Figure 2: *Time (Y axis) and strength (diameter) of maximum of the October Camelopardalids in the years 2005 to 2018. If no data point is given. the peak was outside the European nighttime hours or the data set was too small. Open circles represent years without flux density measure from which we only know the time of maximum.*

Only three nights later we could observe the Draconids in central Europe. on which we reported already elsewhere (e.g. in German VdS-Journal No. 71). Forecasts of different authors (Mikiya Sato. Jeremie Vaubaillon. Sergej Maslov) had predicted enhanced activity of up to ZHR 50 on October 8/9 close to midnight. caused by a durst trail from 1953. Indeed. a strong outburst was detected visually and with our video equipment. This night we recorded over 4.000 shower members. Thanks to the large quantity. we could derive a high-resolution activity profile showing a complex structure (figure 3).

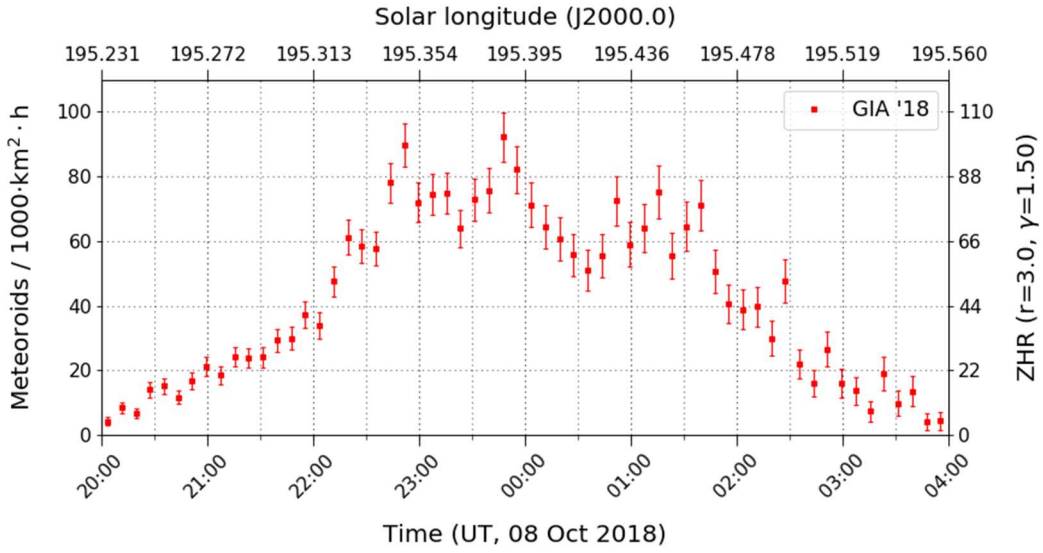

Figure 3: *High resolution flux density profile of the Draconids on October 8/9. 2018. derived from video data of the IMO Network.*

The first peak was observed at 22:50 UT (195.35° solar longitude) with a flux density of 90 meteoroids per 1.000 km^2 and hour. calculated with a population index of r=3.0. Another peak of the same strength occurred one hour later at 23:50 UT (135.39° solar longitude). Thereafter the rate seemed to decline. but the trend reversed at 00:35 UT. Around 01:15 UT (135.45° solar longitude) a tertiary peak was observed. Rates were highly variable at that time. so depending on the chosen resolution even two tertiary peaks can be recognized.
The maximum ZHR of the Draconids as obtained from video was about 100. i.e. a multiple of the predictions. The population index (figure 4) scattered around r=3. 0 and was bigger than the sporadic population index (r=2.7).
Visual observations of IMO revealed a peak ZHR of 160 at 22:45 UT (using r=3.0) and another outlier close to midnight. which matches well to our video data. The tertiary peak is not visible in the visual data.

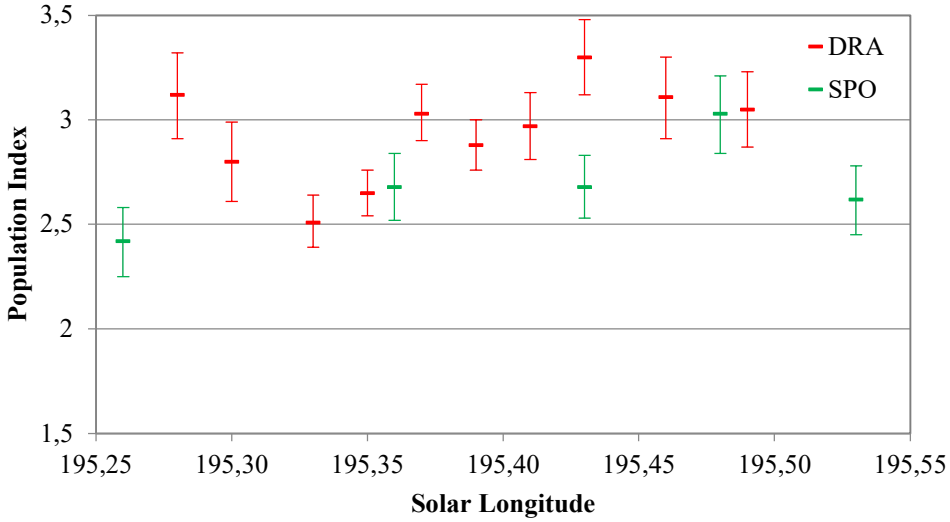

Figure 4: *Population index of the Draconids (red) and the sporadic meteors (green) on October 8/9. 2018.*

Figure 5 gives an impression from the outburst by combining the recordings of the cameras REMO1 to REMO4 in Ketzür into a single panoramic image. The impression that there were fewer Draconids at the center of the image is an illusion. At that region we see overlapping fields of view of one camera that recorded in the evening hours and another one that recorded in the morning hours when there fewer shower meteors than at midnight.

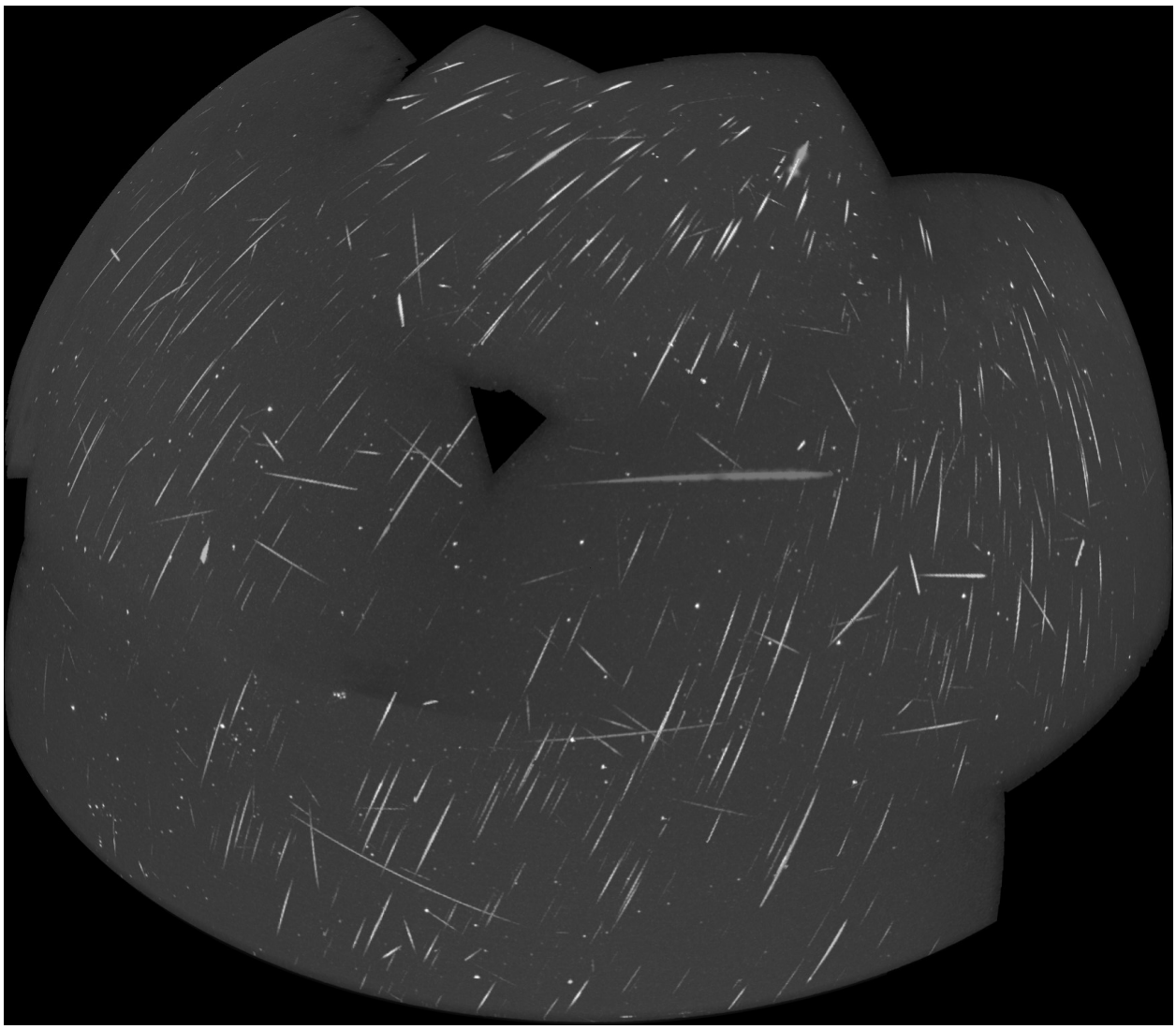

Figure 5: *Panoramic image of the Draconids from recordings of REMO1 to REMO4 in Ketzür on October 8/9 October 2018.*

The other meteor showers of October are quickly summarized. The 2018 activity profile of the October Ursae Majorids fits well to the long-term average of the years 2011 to 2017 (figure 6). whereby the sharp peak at 201.1° solar longitude was not observed this year. The peak flux density was again about 4 meteoroids per 1.000 km^2 and hour and with r=2.6 the population index was 0.2 smaller than the sporadic r-value.

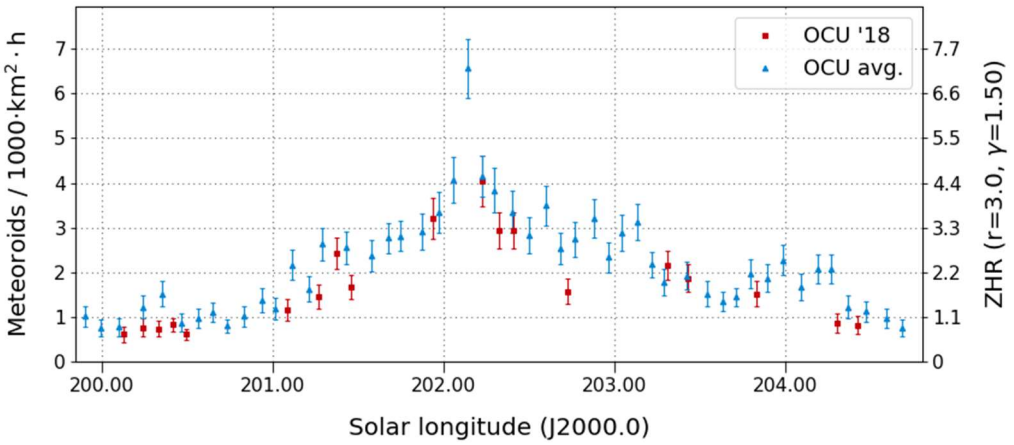

Figure 6: *Comparison of the flux density profile of the October Ursae Majorids 2018 (red) and in the average of 2011-2017 (blue). derived from video data of the IMO Network.*

Also. the activity profile of the Orionids matched to the long-term average with respect to shape and strength. The peak was just a little delayed. The large scatter at the descending activity branch results from the poor weather conditions and the related smaller number of meteors. The population index of the Orionids was 2018 only a little smaller than the r-value of the sporadic meteors.

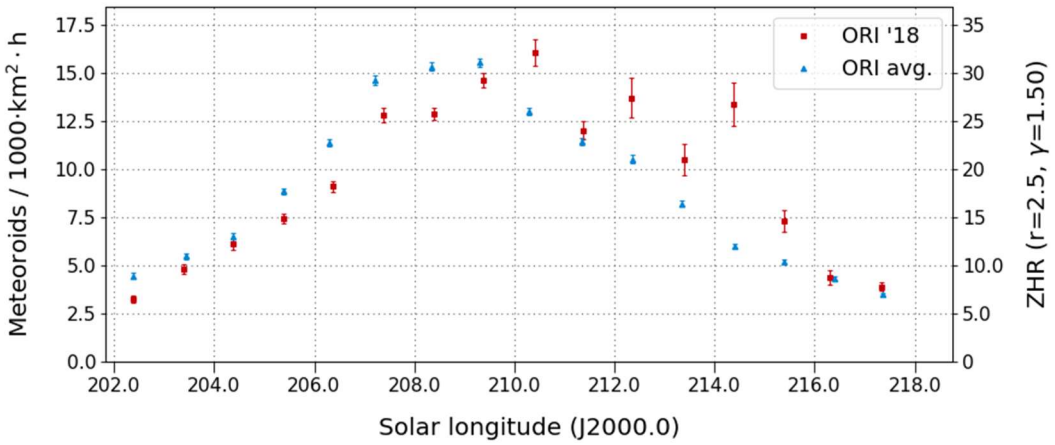

Figure 7: *Comparison of the flux density profile of the Orionids 2018 (red) and in the average of 2012-2017 (blue). derived from video data of the IMO Network.*

1. Observers

Code	Name	Place	Camera	FOV [°²]	St.LM [mag]	Eff.CA [km²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1483	6.2	3812	29	194.7	1751
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5524	4.8	3829	19	167.8	1021
BIATO	Bianchi	Mt. San Lorenzo/IT	OMSL1 (1.2/4)	6422	4.0	1699	24	144.3	658
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5779	3.3	644	28	202.2	1053
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	641	23	169.6	461
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2369	4.2	674	26	201.4	1112
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2374	4.6	1123	26	213.5	1137
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	28	166.1	1743
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2402	5.0	1633	28	194.4	839
CINFR	Cineglosso	Faenza/IT	JENNI (1.2/4)	5995	3.9	1240	29	214.3	1033
CRIST	Crivello	Valbrevenna/IT	ARCI (0.8/3.8)	5566	4.6	2571	22	156.1	1030
			BILBO (0.8/3.8)	5441	4.2	1764	22	177.2	1409
			C3P8 (0.8/3.8)	5489	4.2	1603	22	165.9	902
			STG38 (0.8/3.8)	5574	4.4	1905	22	101.7	1247
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5607	4.3	2381	26	181.4	986
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2387	5.1	2145	18	151.8	1041
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (0.75/4.5)	2260	3.0	206	16	99.2	119
		Tomar/PT	TEMPLAR1 (0.8/6)	2212	5.3	1873	27	236.7	1418
			TEMPLAR2 (0.8/6)	2341	5.0	1718	27	235.3	1184
			TEMPLAR3 (0.8/8)	1438	4.3	542	25	192.2	493
			TEMPLAR4 (0.8/3.8)	5180	3.0	497	27	233.9	1076
			TEMPLAR5 (0.75/6)	2309	5.0	2248	25	185.0	968
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1471	5.5	2170	28	128.1	476
			ORION3 (0.95/5)	3152	4.9	2130	25	153.6	247
			ORION4 (0.95/5)	3818	4.3	1634	25	150.4	223
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	538	20	175.6	627
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2375	5.1	1889	20	179.1	1068
IGAAN	Igaz	Budapest/HU	HUPOL (1.2/4)	2414	3.6	409	26	160.7	160
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	3988	3.6	729	25	188.7	382
			HUSOR2 (0.95/3.5)	2468	3.9	716	25	194.0	397
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	5334	4.3	2028	10	71.3	399
		Kamnik/SI	REZIKA (0.8/6)	2269	4.4	863	14	95.8	761
		Ljubljana/SI	SRAKA (0.8/6)*	2348	4.8	1595	21	113.5	465
		Kamnik/SI	STEFKA (0.8/3.8)	5458	3.6	911	10	74.3	264
KOSDE	Koschny	La Palma / ES	ICC9 (0.85/25)*	660	6.7	2835	28	185.1	2436
			LIC2 (3.2/50)*	1933	6.5	6554	28	132.8	1625
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	728	6.2	2087	5	45.4	347
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5329	4.0	1530	25	163.2	708
			PAV36 (0.8/3.8)*	5484	4.0	1501	25	200.1	1051
			PAV43 (0.75/4.5)*	2251	4.7	1484	20	147.3	781
			PAV60 (0.75/4.5)	2302	5.1	1803	19	153.9	1160
MARRU	Marques	Lisbon/PT	RAN1 (1.4/4.5)	4395	4.0	1330	28	214.4	1050
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5559	3.6	827	11	63.1	439
MISST	Missiaggia	Nove/IT	TOALDO (1.2/4.5)	4329	4.6	2049	24	172.5	1511
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1204	6.9	5982	26	194.5	2463
			DIMCAM1 (0.8/8)	1553	6.8	10447	24	170.5	2467
			ESCIMO2 (0.85/25)	154	8.1	3828	25	199.7	574
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5459	19	156.4	1751
			REMO2 (0.8/8)	1479	6.4	5037	19	168.1	1833
			REMO3 (0.8/8)	1422	6.4	4207	19	179.6	1495
			REMO4 (0.8/8)	1478	6.5	5355	19	178.1	2106
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	3666	3.8	805	27	197.4	359
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3868	4.2	1240	25	162.7	583
NAGHE	Nagy	Budapest/HU	HUKON (0.8/3.8)	5475	4.0	1583	30	193.2	899
		Zamardi/HU	HUZAM (0.8/6)	2359	4.7	1340	8	65.1	154
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	3013	4.3	886	20	157.9	490
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	2317	3.8	373	15	61.5	160
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5557	2.9	470	23	149.7	562
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2359	4.5	907	24	198.6	688
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2354	4.0	536	24	176.3	435
			RO2 (0.75/6)	2365	4.1	635	28	220.3	738
			RO3 (0.8/12)	720	5.7	1126	28	215.9	931
			RO4 (1.0/8)	1568	4.2	546	28	216.4	296
			SOFIA (0.8/12)	726	4.8	516	30	222.6	578
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4170	4.5	2044	29	180.3	349
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	5522	4.7	3184	26	158.2	625
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	1074	5.7	2642	18	87.2	162
			KAYAK2 (0.8/12)	742	5.7	1052	18	116.3	154
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5587	4.5	2362	28	196.7	1834
			NOA38 (0.8/3.8)	5612	4.2	1889	26	203.3	1607
			SCO38 (0.8/3.8)	5583	4.8	3304	26	194.3	1822
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2355	5.6	3423	26	209.2	1934
			MINCAM3 (0.8/6)	2302	4.5	1150	26	202.2	917
			MINCAM4 (0.8/6)	2274	4.7	1001	26	202.7	587
			MINCAM5 (0.8/6)	1481	6.0	3200	26	208.3	1169
			MINCAM6 (0.8/6)	2396	5.3	2748	26	202.7	1018
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2428	4.6	1247	25	175.9	638
			HUMOB (0.8/6)	2388	4.6	1225	21	157.4	552
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2376	4.4	1264	21	138.6	483
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2315	5.5	2769	20	151.8	670
ZAKJU	Zakrajšek	Petkovec/SI	PETKA (0.8/8)	1431	5.6	1956	25	155.8	1060
			TACKA (0.8/12)	715	5.3	784	24	152.6	386
Sum							31	13725.6	74787

* active field of view smaller than video frame

2. Observing Times (h)

October	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	7.5	2.6	8.1	2.8	9.0	4.9	8.9	9.2	8.9	9.1	9.2	9.5	9.3	9.6	9.7
BERER	-	-	-	10.8	10.8	6.9	-	11.0	10.9	11.1	11.2	11.2	11.4	11.4	11.3
BIATO	1.6	9.8	7.7	8.8	1.5	1.7	5.8	7.2	10.7	9.4	5.9	10.2	8.1	11.4	-
BOMMA	-	10.8	10.8	10.8	0.5	0.2	10.7	10.7	11.2	9.5	2.4	11.3	11.5	7.6	1.9
BREMA	4.2	6.3	3.1	10.9	11.2	-	11.3	11.3	11.3	11.3	9.9	11.0	11.8	-	3.2
BRIBE	4.1	2.2	5.2	10.8	10.9	4.6	10.9	10.1	10.9	11.0	10.5	10.2	11.4	9.8	4.8
	3.2	0.6	8.3	10.7	10.9	5.6	10.8	10.9	10.7	11.1	10.4	10.5	11.0	9.7	8.6
CARMA	2.0	7.3	7.6	9.0	0.4	0.5	3.1	5.5	7.2	4.5	1.1	6.2	9.3	2.7	10.4
CASFL	1.8	10.9	10.9	11.1	0.7	1.2	6.5	5.8	9.8	10.7	1.4	11.4	9.4	2.4	9.5
CINFR	-	10.8	10.8	10.7	0.8	0.2	10.7	10.8	11.2	9.9	3.7	11.4	11.5	8.0	2.8
CRIST	0.9	10.6	10.7	10.7	4.3	9.5	6.5	10.9	10.5	-	0.6	8.4	2.2	3.3	3.0
	1.4	10.1	10.1	10.1	4.7	9.3	6.3	10.2	10.0	-	0.6	10.3	11.2	10.7	4.9
	0.9	10.6	10.7	10.7	1.5	7.9	3.3	10.5	8.8	-	1.8	11.1	7.8	8.6	2.6
	1.0	1.7	4.0	3.0	1.1	2.6	1.1	3.0	4.0	-	-	1.1	0.9	6.2	4.3
ELTMA	-	10.6	10.2	9.3	-	0.5	7.5	10.1	11.0	10.8	3.7	11.1	11.4	5.6	1.3
FORKE	-	-	5.4	9.1	7.3	7.2	-	7.2	9.4	9.7	8.2	10.4	10.6	10.2	9.4
GONRU	-	-	9.5	6.9	7.9	10.3	9.3	-	8.6	-	6.3	6.0	-	-	-
	10.4	10.7	10.8	10.7	10.8	10.9	10.9	11.0	11.0	4.1	10.1	10.8	-	3.9	-
	10.8	10.8	10.9	10.8	11.0	11.0	11.0	11.1	11.1	4.0	10.3	10.7	-	4.0	-
	9.8	10.8	10.9	10.9	10.8	11.0	10.9	11.0	11.0	2.9	7.7	10.1	2.6	3.5	1.7
	10.7	10.8	10.9	10.8	11.0	10.5	11.1	11.1	11.1	3.0	9.2	10.6	-	3.6	-
	10.4	10.5	10.6	10.7	10.6	10.8	10.8	10.9	11.0	3.2	8.2	10.1	2.7	4.0	1.4
GOVMI	-	10.2	2.2	10.3	7.4	0.3	-	9.2	-	6.5	6.8	10.3	10.2	2.3	0.2
	-	10.2	7.9	10.2	10.2	3.5	-	9.2	1.9	2.7	10.2	2.2	10.0	9.8	2.3
	-	10.1	5.1	10.2	10.0	1.2	-	8.2	7.8	10.0	10.0	9.8	9.8	5.5	0.5
HERCA	-	-	-	9.3	9.6	11.2	-	-	10.8	11.3	8.3	-	4.1	-	9.9
HINWO	-	1.0	5.9	10.5	10.7	7.9	-	11.1	11.0	11.2	11.2	11.3	11.4	11.5	8.1
IGAAN	1.6	5.4	9.4	8.9	10.0	1.2	1.4	0.7	9.6	9.1	9.1	8.5	10.0	10.4	10.0
JONKA	5.1	5.9	10.6	10.8	10.8	4.0	6.9	8.5	11.1	11.1	11.2	11.3	11.3	11.2	11.3
	3.8	6.5	9.7	9.5	10.8	4.5	2.9	11.0	11.2	11.2	11.3	11.3	11.3	11.4	11.4
KACJA	-	-	-	7.8	6.4	-	-	6.5	6.0	10.5	7.9	11.2	0.1	5.9	-
	-	-	-	9.0	0.1	-	-	7.1	6.9	10.8	11.2	11.3	11.2	-	-
	-	7.8	5.6	8.4	4.3	-	-	3.1	5.8	3.8	5.9	4.1	9.2	4.9	-
	-	-	-	8.3	6.1	-	-	6.2	7.4	10.8	7.1	11.2	0.1	7.9	-
KOSDE	6.5	7.5	5.2	4.9	10.2	-	2.6	4.2	1.3	10.3	10.5	10.5	10.6	10.6	10.6
	5.4	6.3	2.2	2.5	7.5	-	1.8	3.9	0.7	6.2	7.4	8.8	7.2	6.7	8.9
LOTJO	-	-	-	6.4	10.3	10.6	6.8	11.3	-	-	-	-	-	-	-
MACMA	3.3	3.8	4.6	9.8	10.6	10.7	-	7.6	10.0	2.5	10.4	8.7	10.1	10.2	7.8
	4.9	5.0	7.0	10.2	11.0	11.1	-	8.1	10.9	2.5	11.3	11.4	11.2	11.4	10.9
	-	-	-	-	-	-	-	7.8	10.9	2.5	11.1	11.1	11.2	11.2	10.9
	-	-	-	-	-	-	-	8.1	11.1	3.1	11.3	11.3	11.4	11.4	10.8
MARRU	10.6	10.7	10.7	10.8	10.8	10.9	10.9	10.9	10.0	-	8.9	11.0	4.3	3.8	-
MASMI	0.3	3.5	3.5	6.7	10.4	10.5	7.0	-	-	-	-	-	-	-	-
MISST	-	6.9	-	9.9	-	-	5.7	8.3	11.1	11.3	4.2	11.4	11.5	4.5	8.6
MOLSI	4.3	-	9.0	10.2	10.2	1.1	5.7	8.6	6.3	10.6	5.4	10.7	10.8	10.8	10.8
	2.5	-	7.4	10.6	9.7	-	5.6	6.7	5.9	10.9	5.9	11.1	11.1	-	11.2
	3.6	-	8.8	10.7	10.0	-	5.8	8.3	7.0	11.0	6.0	11.1	11.2	11.2	11.3
	9.5	3.3	7.3	2.7	9.7	7.6	9.8	9.8	9.9	9.9	10.0	10.1	3.3	10.2	9.4
	10.0	4.3	8.6	3.8	10.1	8.6	10.3	10.4	10.5	10.4	10.4	10.6	3.4	10.8	10.2
	10.3	5.0	9.6	4.2	10.9	9.3	11.0	11.1	11.1	11.2	11.1	11.3	3.8	11.4	10.7
	10.5	5.3	9.3	4.0	10.9	9.0	11.0	11.0	11.0	11.2	11.2	11.3	3.8	11.4	10.2
MORJO	5.8	6.8	8.6	10.8	10.8	4.5	-	10.9	11.0	11.0	11.0	11.1	11.3	11.3	11.4
MOSFA	2.2	11.0	10.9	11.1	-	-	1.5	3.9	8.9	9.9	0.2	10.3	10.4	1.3	7.6
NAGHE	1.3	7.5	10.8	10.8	10.8	5.7	6.1	11.1	11.1	11.2	11.2	11.3	11.3	11.3	10.8
	-	8.3	9.0	11.0	11.2	-	-	-	-	-	-	-	-	-	-
OCHPA	2.6	9.7	9.8	10.4	0.4	-	1.6	5.9	5.5	10.0	-	9.4	10.5	-	8.9
OTTMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
PERZS	-	9.3	3.1	10.8	10.8	4.4	0.4	10.9	10.9	11.0	11.2	11.2	11.2	10.8	3.1
ROTEC	7.2	1.6	10.7	1.3	10.9	5.0	10.9	10.8	10.8	11.0	9.9	11.2	11.3	-	11.0
SARAN	10.6	10.9	8.3	10.8	9.2	11.1	11.1	11.0	9.4	-	9.0	10.9	6.0	4.2	-
	10.6	10.5	10.7	10.7	-	10.8	10.8	10.9	10.0	-	9.2	10.9	5.9	4.2	-
	10.4	10.2	10.4	5.5	-	10.5	10.5	10.6	10.0	-	5.4	10.5	6.6	4.7	-
	10.8	10.6	10.9	10.8	-	10.9	10.4	10.5	9.9	-	7.6	10.2	4.3	4.1	-
	10.8	10.8	10.9	10.9	10.8	10.9	10.9	11.0	9.8	-	7.6	10.8	5.4	4.2	0.3
SCALE	-	9.3	10.2	10.9	0.3	0.2	7.9	10.7	11.2	11.2	3.4	11.0	10.6	2.6	0.7
SCHHA	1.9	4.4	5.1	10.8	6.1	3.1	6.9	5.1	4.7	7.3	7.2	9.7	11.3	8.8	7.4
SLAST	-	8.2	5.7	7.2	4.5	-	-	-	4.7	6.9	7.6	6.9	8.9	4.5	1.5
	-	8.4	7.2	9.8	5.9	-	-	-	7.4	8.2	7.9	7.4	9.4	6.1	0.4
STOEN	-	10.7	10.9	10.9	-	0.2	7.0	8.1	11.2	11.3	4.7	11.4	11.5	2.9	6.7
	-	10.8	10.9	11.0	0.2	-	7.7	8.1	10.3	11.2	5.0	11.3	11.4	3.1	8.3
	-	10.6	10.6	9.9	0.2	-	7.7	7.3	11.1	10.9	4.7	11.3	11.4	3.1	6.8
STRJO	6.4	3.9	5.3	9.0	10.9	7.0	11.0	10.9	11.2	11.2	8.9	11.3	11.3	11.4	8.9
	4.2	3.1	5.0	9.0	10.7	6.8	10.6	10.8	10.5	11.1	8.7	11.1	11.3	11.4	8.3
	6.1	4.4	4.4	9.3	10.9	7.1	10.9	11.1	10.8	11.2	9.1	11.3	11.4	11.5	8.7
	6.5	4.4	5.1	9.2	10.8	7.4	10.8	10.9	11.1	11.1	8.5	11.1	11.2	11.3	8.3
	5.8	3.9	4.9	9.1	10.6	5.6	11.0	10.9	10.6	11.1	8.4	11.2	11.3	11.4	7.7
TEPIS	-	-	8.4	-	1.3	5.9	6.2	10.9	7.6	11.0	11.1	11.1	11.2	11.2	11.3
	-	3.6	9.0	10.5	10.7	5.0	5.3	10.7	11.0	-	-	-	11.1	10.5	11.2
WEGWA	-	1.5	4.4	8.4	8.6	6.9	-	7.0	5.3	11.0	7.2	11.2	11.2	6.6	11.1
YRJIL	1.9	1.9	-	5.2	10.4	7.8	10.5	-	-	10.7	-	-	8.5	11.2	11.0
ZAKJU	-	-	10.7	10.5	3.9	-	0.2	2.3	9.6	10.7	7.7	7.9	11.2	6.7	5.5
	-	10.7	7.2	9.9	3.8	-	-	0.9	6.1	10.6	7.3	7.7	11.3	5.7	3.7
Sum	278.0	484.2	575.9	706.2	561.1	387.3	460.5	649.6	699.2	598.7	577.4	757.2	667.4	548.7	468.9

October	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	8.4	9.5	-	9.8	4.7	9.4	9.7	0.2	2.4	0.8	1.0	3.6	-	0.7	6.7	9.5
BERER	-	-	3.0	5.4	2.3	0.5	3.4	-	11.9	-	-	-	-	-	11.1	12.2
BIATO	-	1.1	4.9	5.8	5.8	0.9	0.3	5.6	11.4	-	1.0	-	-	-	7.7	-
BOMMA	-	0.5	10.9	11.6	11.7	3.9	7.9	8.4	10.0	9.5	0.3	2.6	5.3	7.0	2.7	-
BREMA	10.2	6.7	3.5	11.0	5.4	2.6	8.9	-	-	-	0.2	0.9	3.4	-	-	-
BRIBE	7.6	8.2	1.3	10.3	11.5	6.4	9.1	-	-	-	6.1	6.3	-	-	4.1	3.1
	8.6	8.9	11.4	6.4	11.5	9.0	8.8	-	-	-	1.2	4.9	-	-	5.7	4.1
CARMA	4.7	5.6	11.6	8.5	11.3	7.3	12.0	7.9	11.1	0.7	-	-	3.8	0.7	4.1	-
CASFL	4.1	5.7	11.8	8.6	11.3	6.5	11.9	7.6	9.5	0.7	-	-	2.7	0.7	9.8	-
CINFR	-	1.8	11.4	11.6	11.7	5.0	8.0	8.5	11.1	9.6	1.1	5.1	5.1	7.2	2.8	1.0
CRIST	-	0.6	5.4	10.5	11.5	11.5	11.6	8.4	4.5	-	-	-	-	-	-	-
	-	0.8	6.9	11.3	11.3	11.2	11.6	8.8	5.4	-	-	-	-	-	-	-
	-	0.7	7.7	11.5	11.5	10.9	11.6	10.4	4.8	-	-	-	-	-	-	-
	-	0.5	6.6	10.2	9.1	11.5	11.6	10.2	7.9	0.1	-	-	-	-	-	-
ELTMA	-	3.7	9.2	9.4	10.4	9.9	11.7	2.6	4.8	0.3	-	-	2.8	4.3	7.1	2.1
FORKE	7.5	10.5	-	-	-	11.3	2.1	-	-	-	-	-	-	-	6.9	9.4
GONRU	-	-	7.5	2.5	2.2	6.2	6.8	1.8	5.1	-	2.3	-	-	-	-	-
	5.8	2.2	9.7	5.6	3.0	9.0	10.9	9.2	10.3	-	4.3	9.7	11.7	-	8.8	10.4
	5.9	1.5	9.6	4.8	3.3	6.7	10.8	9.4	11.6	-	4.4	10.1	11.8	-	7.8	10.1
	5.4	0.4	9.4	3.2	3.2	6.1	10.9	9.0	11.5	-	-	-	-	-	-	7.5
	5.8	1.3	9.3	5.1	4.0	7.2	10.7	9.9	11.6	-	5.0	9.3	11.8	-	8.6	9.9
	5.4	0.3	9.2	4.0	3.4	5.6	9.7	5.4	9.3	-	-	-	-	-	-	6.8
GOVMI	0.2	1.3	3.0	10.2	1.3	1.3	0.6	0.5	0.8	4.8	3.7	0.8	0.9	1.2	11.7	9.9
	-	7.9	6.1	6.1	2.2	-	-	0.9	2.5	5.1	5.6	-	1.2	4.0	12.0	9.7
	-	2.6	5.3	9.8	0.6	-	1.0	-	1.8	4.6	3.8	-	2.2	2.4	11.2	6.9
HERCA	-	-	10.9	10.6	-	7.6	8.8	0.9	-	10.7	10.6	10.0	11.5	9.1	3.5	6.9
HINWO	6.9	11.6	-	-	-	11.9	2.3	-	-	-	-	-	-	3.1	9.8	10.7
IGAAN	-	2.6	-	5.9	4.4	0.6	0.7	-	10.0	4.3	5.5	-	-	2.1	9.9	9.4
JONKA	2.3	4.6	3.4	3.8	4.3	-	-	-	11.2	2.5	2.8	0.5	-	-	-	12.2
	2.0	2.9	2.5	6.1	-	-	-	-	9.8	2.8	3.7	1.9	-	-	12.2	12.3
KACJA	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	4.3	0.7	4.5	9.9	-	-	3.0	-	-	-	-	-	5.8
	-	-	5.2	7.6	2.3	5.0	10.7	1.1	5.5	7.4	-	-	-	-	3.2	2.6
	-	-	9.2	-	-	-	-	-	-	-	-	-	-	-	-	-
KOSDE	10.6	10.7	5.7	4.8	6.3	1.8	3.1	5.3	-	5.4	5.2	3.0	-	4.8	4.9	8.0
	7.0	7.5	3.0	3.8	5.4	0.9	2.8	4.2	-	5.5	4.0	0.8	0.3	-	4.4	7.7
LOTJO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACMA	10.5	8.2	5.8	2.0	2.0	4.1	0.8	0.1	-	-	-	-	-	8.5	2.5	8.6
	11.8	11.8	11.6	3.0	2.6	5.7	2.7	-	0.5	-	-	-	-	10.5	3.9	9.1
	11.4	11.4	11.5	1.9	2.9	5.2	2.7	0.6	0.7	-	-	-	-	9.0	3.9	9.4
	11.5	11.6	11.6	3.1	2.5	6.5	3.0	0.5	-	-	-	-	-	11.1	4.3	9.7
MARRU	11.2	1.4	7.9	3.7	3.9	7.7	7.6	3.4	8.4	1.5	10.2	4.5	11.5	-	1.6	5.6
MASMI	-	-	-	-	-	-	-	-	-	5.1	-	11.9	-	-	2.5	1.7
MISST	1.0	4.7	9.3	11.6	11.1	10.0	11.6	3.8	10.7	-	0.3	-	0.3	0.7	4.0	-
MOLSI	10.9	11.0	11.0	7.4	2.3	11.2	1.0	-	-	2.2	3.3	-	-	8.3	8.6	2.8
	10.4	11.3	11.2	6.1	1.3	10.3	0.6	-	-	1.2	1.5	-	-	7.0	9.8	1.2
	11.2	11.4	11.5	7.5	2.6	11.6	1.3	-	-	2.8	2.6	-	-	8.7	9.9	2.6
	9.7	10.3	6.1	7.8	-	-	-	-	-	-	-	-	-	-	-	-
	9.9	10.8	6.7	8.3	-	-	-	-	-	-	-	-	-	-	-	-
	10.8	11.7	6.2	8.9	-	-	-	-	-	-	-	-	-	-	-	-
	10.4	11.7	5.9	9.0	-	-	-	-	-	-	-	-	-	-	-	-
MORJO	7.1	8.1	2.8	2.1	5.7	0.8	1.8	-	8.5	3.7	2.0	13.1	-	-	3.0	2.4
MOSFA	5.0	3.8	9.5	5.2	8.0	9.1	11.4	6.1	9.9	-	-	-	0.8	0.2	4.5	-
NAGHE	0.8	1.6	2.0	5.6	5.4	0.6	1.3	0.6	10.6	3.6	4.4	0.6	-	1.3	7.0	5.5
	-	-	-	-	-	-	-	-	-	-	-	-	0.3	1.2	12.4	11.7
OCHPA	9.5	-	11.3	1.6	10.1	10.1	11.2	8.3	11.1	-	-	-	-	-	-	-
OTTMI	2.5	3.8	2.6	3.6	9.0	7.2	7.3	8.4	2.7	-	0.3	2.0	6.6	3.6	0.4	-
PERZS	2.1	6.3	5.7	10.0	-	0.3	1.6	0.2	-	1.6	2.8	-	-	-	-	-
ROTEC	11.1	11.4	2.0	9.4	5.9	8.8	10.1	0.3	-	-	-	-	-	-	5.5	10.5
SARAN	4.3	-	-	-	-	3.9	4.4	2.6	6.9	1.2	7.3	2.4	10.7	-	3.4	6.7
	10.9	3.2	7.9	1.7	2.8	10.5	9.8	8.4	11.0	2.2	10.2	5.5	11.3	0.5	2.6	6.6
	10.6	2.8	9.0	3.7	3.5	10.2	9.9	8.4	10.8	3.2	10.1	7.2	11.0	0.6	2.9	6.7
	10.5	2.2	7.9	2.5	2.2	9.8	10.0	7.9	10.8	4.1	10.3	6.2	11.2	1.0	2.3	6.5
	10.0	2.4	7.7	3.2	2.8	8.7	7.4	5.7	10.4	1.8	10.2	6.6	10.8	0.7	2.8	6.3
SCALE	-	0.3	10.8	11.1	10.0	9.9	9.8	1.4	7.7	2.6	0.2	0.2	4.9	5.1	5.1	1.0
SCHHA	5.8	6.6	0.2	4.8	11.8	4.9	6.5	-	-	-	5.6	4.5	-	-	5.7	2.0
SLAST	-	-	1.0	0.5	-	3.0	-	2.3	4.1	4.3	-	-	-	-	-	5.4
	-	-	-	0.7	-	4.1	8.0	3.4	4.2	9.3	-	-	-	-	-	8.5
STOEN	0.2	7.4	9.1	11.7	9.7	10.8	11.9	3.6	4.2	0.3	-	0.4	5.5	4.7	7.8	1.9
	-	7.8	9.7	11.7	10.0	11.7	11.7	2.5	7.6	-	0.2	-	6.6	4.9	8.0	1.6
	-	7.4	9.6	11.6	9.7	12.0	11.6	4.7	2.8	-	0.2	-	5.1	4.8	7.5	1.7
STRJO	7.1	7.9	10.1	9.7	7.1	7.1	10.1	-	-	-	0.5	6.6	-	-	1.0	3.4
	7.7	8.2	10.4	9.4	7.1	7.1	9.9	-	-	-	0.5	5.0	-	-	1.1	3.2
	6.4	8.3	1.6	10.0	7.6	7.3	10.5	-	-	-	1.3	7.2	-	-	1.0	3.3
	7.7	8.3	10.4	10.0	7.3	7.1	10.0	-	-	-	1.7	3.6	-	-	1.0	3.5
	5.8	7.2	10.1	10.2	7.1	6.8	8.8	-	-	-	2.4	6.3	-	-	1.0	3.5
TEPIS	3.1	3.2	2.5	5.2	6.9	0.8	2.7	-	9.2	0.6	9.4	-	-	2.4	11.9	10.8
	1.0	1.3	1.0	5.5	6.7	-	-	-	8.7	-	9.5	-	-	2.3	11.8	11.0
WEGWA	5.1	-	3.8	-	-	6.0	2.4	-	-	0.2	-	-	-	1.6	9.7	9.4
YRJIL	3.5	-	10.3	10.0	5.7	-	10.7	-	3.2	-	2.3	2.2	12.3	12.5	-	-
ZAKJU	0.8	1.8	5.8	9.7	4.5	7.4	7.8	3.8	6.4	5.5	-	-	0.7	-	5.9	8.8
	-	0.3	4.6	8.9	4.8	6.8	9.3	5.3	6.9	5.6	-	-	1.7	-	5.1	8.4
Sum	377.7	371.1	519.3	509.7	390.2	457.3	499.1	228.5	373.8	140.4	181.1	165.5	185.8	158.5	358.1	389.2

3. Results (Meteors)

October	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	57	9	55	16	92	26	79	156	58	82	78	79	64	99	103
BERER	-	-	-	65	75	12	-	65	43	50	50	47	78	76	78
BIATO	3	34	26	43	10	5	18	84	24	31	40	12	24	24	-
BOMMA	-	69	56	77	2	2	48	107	50	28	8	45	58	23	6
BREMA	4	10	5	20	37	-	25	77	27	27	30	26	41	-	12
BRIBE	11	7	15	46	54	11	57	151	62	52	62	55	72	48	28
	11	2	25	51	54	17	47	130	58	52	41	46	56	27	36
CARMA	23	81	95	117	7	6	23	167	82	58	15	78	115	6	52
CASFL	7	49	48	59	3	3	11	72	42	37	4	49	31	4	20
CINFR	-	62	58	78	1	1	46	137	49	28	8	30	60	18	3
CRIST	7	46	54	58	15	50	23	152	61	-	1	53	11	13	13
	10	59	57	60	17	61	33	140	71	-	4	64	66	46	20
	11	46	49	43	7	42	14	106	45	-	13	51	21	26	10
	7	10	7	3	4	7	6	17	29	-	-	6	5	74	49
ELTMA	-	52	47	48	-	4	28	99	22	45	13	45	48	27	6
FORKE	-	-	36	53	55	26	-	132	54	58	68	73	66	75	40
GONRU	-	-	9	1	7	1	14	-	11	-	6	4	-	-	-
	49	66	55	54	57	76	70	178	60	9	37	50	-	13	-
	38	40	59	50	54	48	50	165	43	4	32	34	-	9	-
	14	25	22	37	19	27	25	57	34	2	10	16	6	3	8
	53	56	29	49	63	42	39	103	38	7	30	45	-	2	-
	35	38	53	48	63	44	61	151	53	2	24	31	9	6	8
GOVMI	-	28	18	42	31	2	-	51	-	21	24	24	35	5	2
	-	20	5	15	22	4	-	15	3	6	9	5	13	7	2
	-	15	7	16	12	2	-	8	5	12	12	9	17	6	1
HERCA	-	-	-	22	17	22	-	-	26	36	25	-	6	-	27
HINWO	-	5	24	52	44	16	-	157	37	60	52	77	66	90	38
IGAAN	1	5	15	7	11	1	1	2	6	4	4	3	9	8	14
JONKA	5	4	19	28	21	2	8	15	19	16	19	23	24	16	15
	2	5	16	7	15	4	17	31	16	25	17	9	26	20	29
KACJA	-	-	-	44	33	-	-	43	20	57	17	57	51	19	-
	-	-	-	82	44	-	-	53	29	95	79	94	83	-	-
	-	42	31	39	20	-	-	9	14	13	15	8	31	11	-
	-	-	-	32	17	-	-	23	11	43	11	31	32	22	-
KOSDE	66	78	36	43	119	-	22	74	18	134	142	132	148	138	151
	47	58	23	21	82	-	29	90	7	80	82	96	86	94	117
LOTJO	-	-	-	25	75	57	39	151	-	-	-	-	-	-	-
MACMA	10	9	12	33	51	41	-	81	28	4	29	34	33	39	44
	22	15	27	59	59	50	-	92	56	1	61	65	55	66	47
	-	-	-	-	-	-	-	64	47	1	53	47	62	71	66
	-	-	-	-	-	-	-	168	68	5	76	88	79	111	81
MARRU	38	36	39	35	37	39	33	79	24	-	42	35	12	5	-
MASMI	2	22	32	18	76	67	34	-	-	-	-	-	-	-	-
MISST	-	79	-	94	-	-	13	125	74	101	31	91	96	27	43
MOLSI	34	-	83	193	112	4	54	93	26	161	46	165	182	172	179
	15	-	77	178	111	-	48	68	20	182	61	195	222	-	213
	7	-	22	28	13	-	9	12	6	40	14	41	35	33	47
	93	23	50	14	138	65	97	242	59	104	121	133	24	145	83
	109	21	47	19	127	61	94	268	90	132	124	129	12	152	97
	85	30	54	13	105	47	74	221	73	107	98	128	25	108	73
	127	28	49	23	128	78	105	357	102	151	122	175	26	155	93
MORJO	11	5	9	21	18	2	-	29	16	15	16	19	18	14	21
MOSFA	8	27	35	35	-	-	2	37	15	26	1	28	36	6	12
NAGHE	8	18	36	48	42	12	19	67	42	36	38	41	40	41	53
	-	17	9	27	26	-	-	-	-	-	-	-	-	-	-
OCHPA	5	19	25	30	1	-	6	50	9	22	-	17	23	-	15
OTTMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
PERZS	-	15	7	12	22	15	2	96	31	57	40	42	28	34	2
ROTEC	25	1	34	3	40	11	28	95	26	29	28	51	30	-	48
SARAN	17	15	13	27	17	17	21	73	20	-	20	22	12	2	-
	12	17	26	19	-	40	46	82	21	-	14	18	22	3	-
	28	21	25	22	-	45	43	136	36	-	17	33	21	6	-
	7	7	1	8	-	17	7	32	9	-	6	12	6	1	-
	17	22	22	20	30	19	17	60	11	-	23	12	4	4	1
SCALE	-	20	16	26	2	2	9	25	13	18	1	12	8	7	2
SCHHA	3	5	14	42	20	6	34	54	10	32	18	41	68	22	22
SLAST	-	25	11	13	10	-	-	-	4	10	19	6	12	3	3
	-	15	10	15	7	-	-	-	2	14	8	5	11	5	2
STOEN	-	78	93	120	-	1	18	189	74	103	27	84	104	18	33
	-	94	78	101	1	-	26	214	60	65	22	77	73	12	21
	-	91	105	104	1	-	27	150	67	91	23	76	91	15	26
STRJO	33	17	16	95	99	24	101	253	86	90	94	100	109	120	69
	22	4	5	49	45	8	40	121	45	50	34	48	65	50	27
	11	9	8	23	32	9	33	104	15	36	28	30	29	40	15
	24	14	13	52	57	15	63	181	44	46	53	58	48	70	28
	18	9	13	51	47	4	47	74	42	59	55	57	59	73	35
TEPIS	-	-	36	-	4	8	12	49	31	45	35	28	40	44	43
	-	4	36	36	44	13	10	48	35	-	-	-	39	24	48
WEGWA	-	3	11	35	42	9	-	20	8	31	21	33	35	30	32
YRJIL	2	4	-	23	47	12	36	-	-	39	-	-	18	51	63
ZAKJU	-	-	94	95	19	-	1	22	45	80	44	34	73	24	33
	-	28	18	32	8	-	-	2	12	30	10	9	24	9	13
Sum	1254	1888	2365	3442	2897	1362	2042	7301	2729	3187	2655	3826	3467	2867	2631

October	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	89	80	-	104	107	87	65	1	5	6	2	8	-	2	67	75
BERER	-	-	9	28	4	5	38	-	127	-	-	-	-	-	90	81
BIATO	-	7	26	42	75	12	2	39	42	-	4	-	-	-	31	-
BOMMA	-	3	60	71	79	14	52	50	28	49	2	3	13	25	25	-
BREMA	15	14	6	35	16	2	23	-	-	-	1	4	4	-	-	-
BRIBE	44	10	8	63	85	19	45	-	-	-	28	30	-	-	39	10
	48	22	67	49	83	68	54	-	-	-	7	18	-	-	47	21
CARMA	19	49	106	45	93	141	191	57	83	6	-	-	11	1	16	-
CASFL	6	21	47	27	60	60	103	33	29	3	-	-	2	2	7	-
CINFR	-	11	54	76	97	18	27	38	31	30	2	10	8	29	21	2
CRIST	-	5	38	86	101	79	80	52	32	-	-	-	-	-	-	-
	-	4	51	112	146	110	123	85	70	-	-	-	-	-	-	-
	-	5	31	53	69	73	79	79	29	-	-	-	-	-	-	-
	-	6	84	144	174	178	181	152	103	1	-	-	-	-	-	-
ELTMA	-	17	50	79	38	109	103	30	14	2	-	-	16	5	35	4
FORKE	48	71	-	-	-	84	28	-	-	-	-	-	-	-	49	25
GONRU	-	-	8	14	7	22	10	2	1	-	2	-	-	-	-	-
	18	4	78	41	20	39	101	64	48	-	8	42	83	-	38	60
	11	4	57	25	31	34	71	57	56	-	8	61	69	-	24	50
	8	2	20	14	24	10	33	22	32	-	-	-	-	-	-	23
	13	5	45	28	29	37	80	37	33	-	4	64	81	-	24	40
	17	2	56	17	38	30	62	39	53	-	-	-	-	-	-	28
GOVMI	1	9	27	32	1	1	6	3	7	9	7	2	7	7	46	28
	-	7	19	21	1	-	-	1	7	7	5	-	1	11	29	12
	-	2	17	16	1	-	5	-	5	8	5	-	5	6	24	7
HERCA	-	-	46	56	-	59	47	4	-	60	45	37	42	25	4	21
HINWO	50	67	-	-	-	96	29	-	-	-	-	-	-	16	63	29
IGAAN	-	2	-	13	4	2	1	-	23	4	3	-	-	1	12	4
JONKA	9	11	3	19	4	-	-	-	57	13	7	2	-	-	-	23
	9	3	5	22	-	-	-	-	32	16	10	4	-	-	41	16
KACJA	-	-	58	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	40	1	9	124	-	-	3	-	-	-	-	-	25
	-	-	26	10	5	16	95	3	20	15	-	-	-	-	34	8
	-	-	42	-	-	-	-	-	-	-	-	-	-	-	-	-
KOSDE	166	156	74	107	153	17	42	86	-	78	75	10	-	38	46	87
	94	104	34	58	99	9	32	52	-	55	43	6	2	-	47	78
LOTJO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACMA	53	54	35	1	28	7	3	1	-	-	-	-	-	26	27	25
	75	67	42	1	47	17	9	-	3	-	-	-	-	42	45	28
	73	62	39	4	60	9	4	5	4	-	-	-	-	40	38	32
	96	85	62	7	61	23	9	3	-	-	-	-	-	51	43	44
MARRU	41	13	69	29	41	96	45	24	56	10	46	42	48	-	4	32
MASMI	-	-	-	-	-	-	-	-	-	74	-	77	-	-	30	7
MISST	4	45	77	110	78	165	164	29	41	-	2	-	2	4	16	-
MOLSI	167	179	154	26	13	189	4	-	-	6	5	-	-	90	119	7
	171	190	130	18	12	257	4	-	-	5	9	-	-	138	141	2
	28	51	24	10	2	61	3	-	-	2	3	-	-	39	41	3
	95	108	96	61	-	-	-	-	-	-	-	-	-	-	-	-
	81	108	99	63	-	-	-	-	-	-	-	-	-	-	-	-
	60	94	58	42	-	-	-	-	-	-	-	-	-	-	-	-
	98	143	81	65	-	-	-	-	-	-	-	-	-	-	-	-
MORJO	13	11	3	5	5	3	12	-	24	18	3	7	-	-	25	16
MOSFA	9	17	32	7	29	65	70	34	38	-	-	-	2	1	11	-
NAGHE	7	13	7	60	20	5	11	4	61	32	18	3	-	5	71	41
	-	-	-	-	-	-	-	-	-	-	-	-	2	2	49	22
OCHPA	18	-	29	3	33	31	59	33	62	-	-	-	-	-	-	-
OTTMI	13	20	4	16	24	17	19	14	2	-	1	1	10	6	3	-
PERZS	10	10	40	58	-	2	22	1	-	12	4	-	-	-	-	-
ROTEC	44	35	10	25	46	22	6	1	-	-	-	-	-	-	22	28
SARAN	4	-	-	-	-	36	22	12	21	4	15	3	24	-	2	16
	48	3	39	6	20	47	39	36	32	7	34	31	44	1	2	29
	53	15	59	15	15	92	29	34	32	4	24	32	43	3	5	43
	19	5	14	2	8	31	20	12	11	2	8	14	21	3	3	10
	37	5	29	11	22	56	14	7	27	1	28	31	26	3	1	18
SCALE	-	2	23	28	14	44	44	7	7	1	1	1	3	6	5	2
SCHHA	12	8	1	10	83	19	19	-	-	-	18	23	-	-	33	8
SLAST	-	-	5	3	-	6	-	13	2	10	-	-	-	-	-	7
	-	-	-	4	-	4	17	13	7	8	-	-	-	-	-	7
STOEN	1	91	86	132	66	174	153	35	21	2	-	2	33	35	52	9
	-	78	69	120	42	173	133	11	18	-	1	-	34	46	33	5
	-	82	86	120	59	194	208	42	3	-	1	-	35	56	60	9
STRJO	85	40	102	121	112	45	60	-	-	-	3	18	-	-	11	31
	46	11	47	58	50	25	35	-	-	-	1	13	-	-	10	8
	13	14	2	26	31	15	41	-	-	-	2	11	-	-	5	5
	57	10	71	80	82	25	54	-	-	-	4	2	-	-	5	13
	46	9	63	81	64	27	34	-	-	-	10	17	-	-	4	20
TEPIS	5	8	4	18	38	3	17	-	39	3	33	-	-	2	69	24
	6	8	2	18	46	-	-	-	35	-	35	-	-	5	42	18
WEGWA	9	-	13	-	-	28	29	-	-	1	-	-	-	6	60	27
YRJIL	7	-	60	30	21	-	93	-	22	-	8	12	60	62	-	-
ZAKJU	3	10	94	41	9	62	63	51	33	30	-	-	10	-	43	47
	-	2	18	13	8	22	33	24	17	12	-	-	5	-	20	17
Sum	2272	2409	3230	3095	2934	3537	3533	1432	1585	609	585	641	746	840	2009	1417